Systemic
Mission Assurance Concerns

2006 SMA

Compliance Verification and Supplier Assurance Workshop

Honeywell Technology Solutions, Inc.

September 27, 2006

Honeywell

Agenda

- ➢ **Data Source**

- ➢ **Risk Assessment Scores – SAC Contract**

- ➢ **AS9100 Paragraphs**

- ➢ **Pareto of AS9100 Issues**

- ➢ **AS9100 Sections Most Identified During Audit**

- ➢ **Suppliers with > 1 AS9100 Finding per Section**

- ➢ **Assess All, But Focus on Systemic Issues**

- ➢ **The Infrastructure Impacts Everything**

- ➢ **Software – Calibration – Document Control – Identify Requirements – Corrective Action – Environment**

- ➢ **FAA's 11 Year Trend Data – Top 10 FAA Concerns**

- ➢ **Compliance Verification Information System (CVIS)**

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Supplier Assurance Contract (SAC)
Now *NASA Supplier Assurance Services* *(NCAS)*
NASA Risk Assessments Results

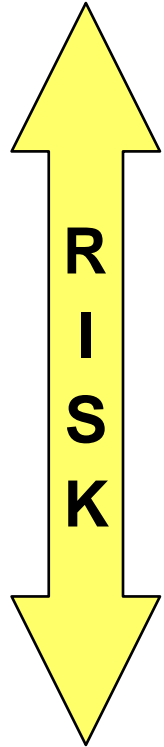## 32 Honeywell Lead NASA Risk Assessments

- ➢ **9 Companies with   55-142   Employees**
- ➢ **6 Companies with   282-747   Employees**
- ➢ **9 Companies with 2734-7670 Employees**
- ➢ **8 Universities**

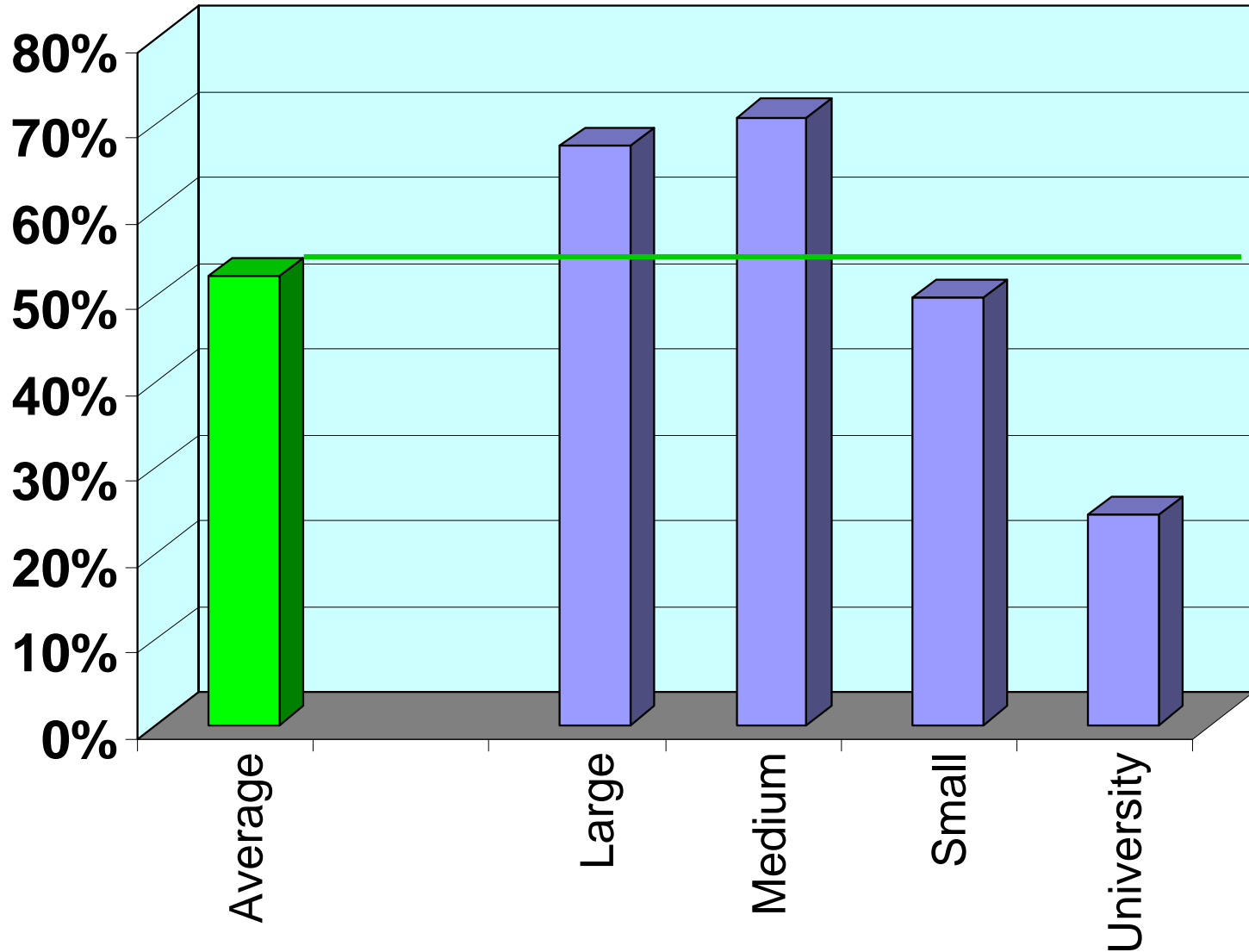**A Cross-Section of Suppliers Supporting NASA**

Risk Assessment Scores – SAC Contract

AS9100 Paragraphs

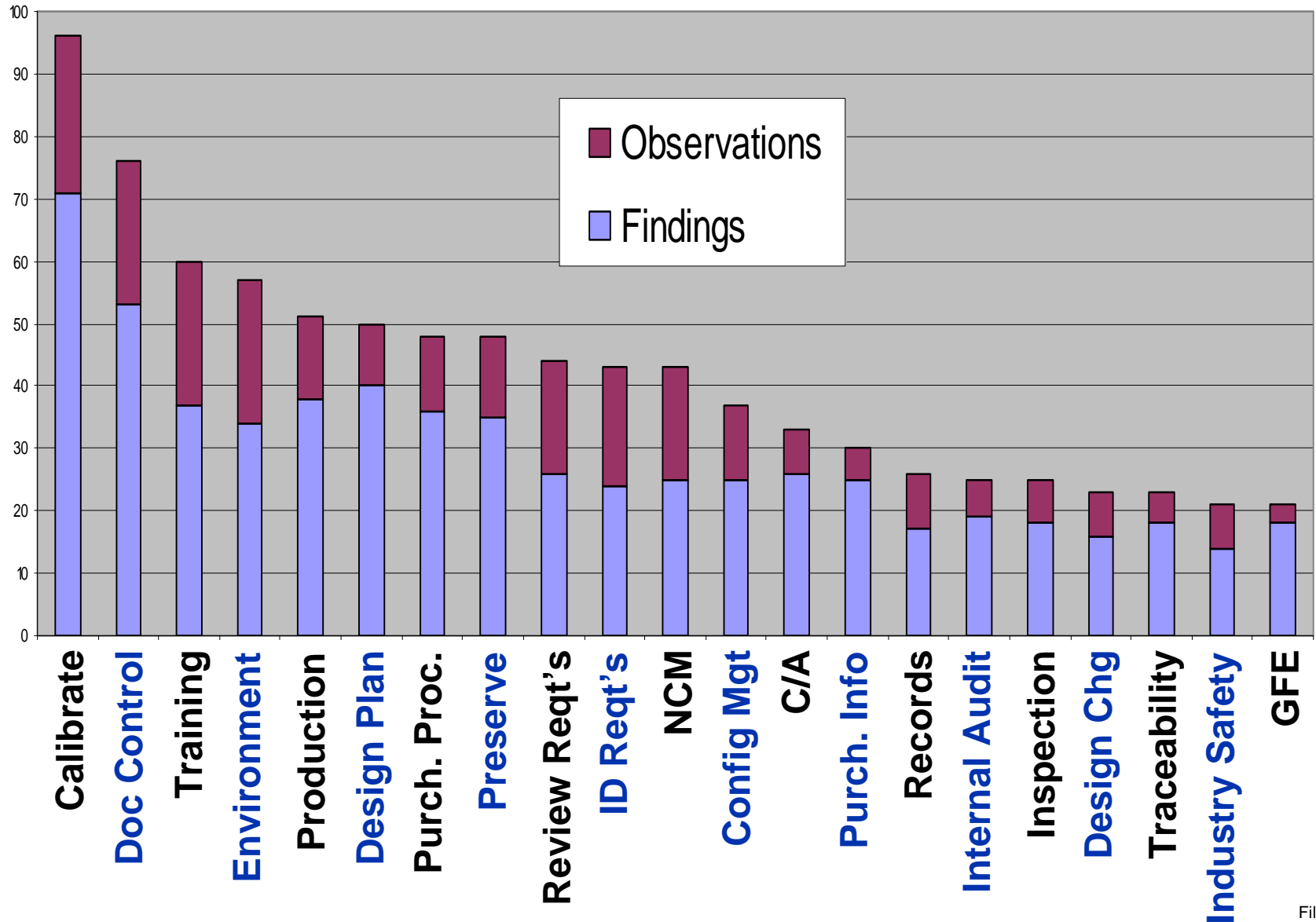|			
4	**Quality Management System**	7.3.3	Design & Development Outputs
4.1	General Requirements	7.3.4	Design & Development Review
4.2	**Documentation Requirements**	7.3.5	Design & Development Verification
4.2.1	General	7.3.6	Design & Development Validation
4.2.2	Quality Manual	7.3.6.1	Documentation of Design and/or Development Verification and Validation
4.2.3	Control of Documents	7.3.6.2	Design and/or Development Verification and Validation Testing
4.2.4	Control of Records	7.3.7	Control of Design & Development Changes
4.3	Configuration Management	**7.4**	**Purchasing**
5	**Management Responsibility**	7.4.1	Purchasing Process
5.1	Management Commitment	7.4.2	Purchasing Information
5.2	Customer Focus	7.4.3	Verification of Purchased Product
5.3	Quality Policy	**7.5**	**Production & Service Provision**
5.4	**Planning**	7.5.1	Control of Production & Service Provision - including
5.4.1	Quality Objectives	7.5.1.1	Production Documentation
5.4.2	Quality Management System Planning	7.5.1.2	Control of production Process Changes
5.5	**Responsibility, Authority & Communications**	7.5.1.3	Control of Production Equipment, Tools and Numerical Control (N.C.) Machine Programs
5.5.1	Responsibility & Authority	7.5.1.4	Control of Work Transferred, on a Temporary Basis, Outside the Organization's Facilities
5.5.2	Management Representative	7.5.1.5	Control of Service Operations
5.5.3	Internal Communication	7.5.2	Validation of Processes for Production & Service Provision
5.6	**Management Review**	7.5.3	Identification & Traceability
5.6.1	General	7.5.4	Customer Property
5.6.2	Review Input	7.5.5	Preservation of Product
5.6.3	Review Output	7.6	Control of Monitoring & Measuring Devices
6	**Resource Management**	**8**	**Measurement, Analysis & Improvement**
6.1	Provision of Resources	8.1	General
6.2	**Human Recourses**	**8.2**	**Monitoring & Measurement**
6.2.1	General	8.2.1	Customer Satisfaction
6.2.2	Competence, Awareness & Training	8.2.2	Internal Audit
6.3	Infrastructure	8.2.3	Monitoring & Measurement of Processes
6.4	Work Environment	8.2.4	Monitoring & Measurement of Product
7	**Product Realization**	8.2.4.1	Inspection Documentation
7.1	Planning of Product Realization	8.2.4.2	First Article Inspection
7.2	**Customer-related Processes**	8.3	Control of Nonconforming Product
7.2.1	Determination of Requirements Related to the Product	8.4	Analysis of Data
7.2.2	Review of Requirements Related to the Product	**8.5**	**Improvement**
7.2.3	Customer Communication	8.5.1	Continual Improvement
7.3	**Design & Development**	8.5.2	Corrective Action
7.3.1	Design & Development Planning	8.5.3	Preventive Action
7.3.2	Design & Development Inputs		

An Industry Standard Known to NASA & Suppliers

Pareto of AS9100 Issues
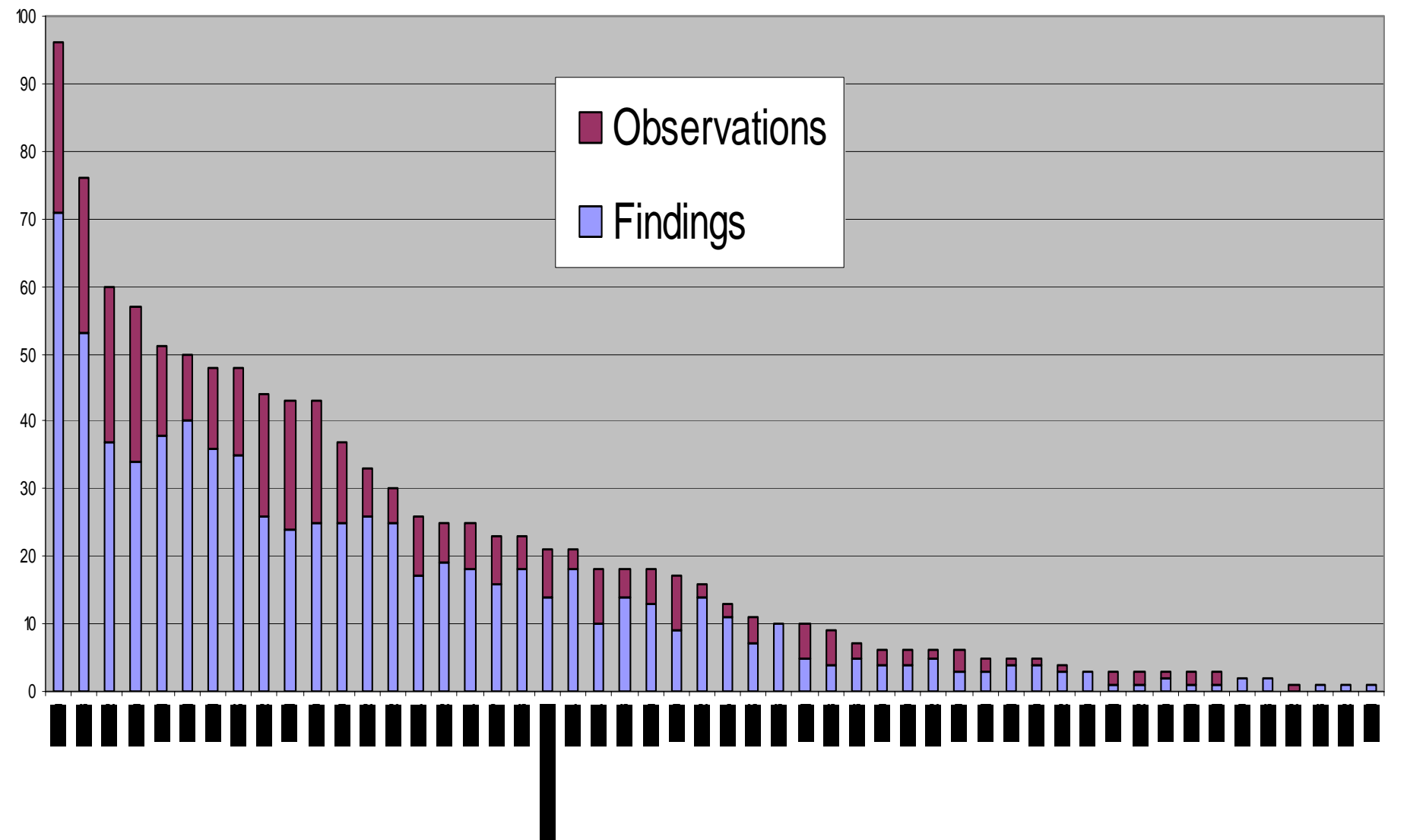
Legend:
- Observations
- Findings
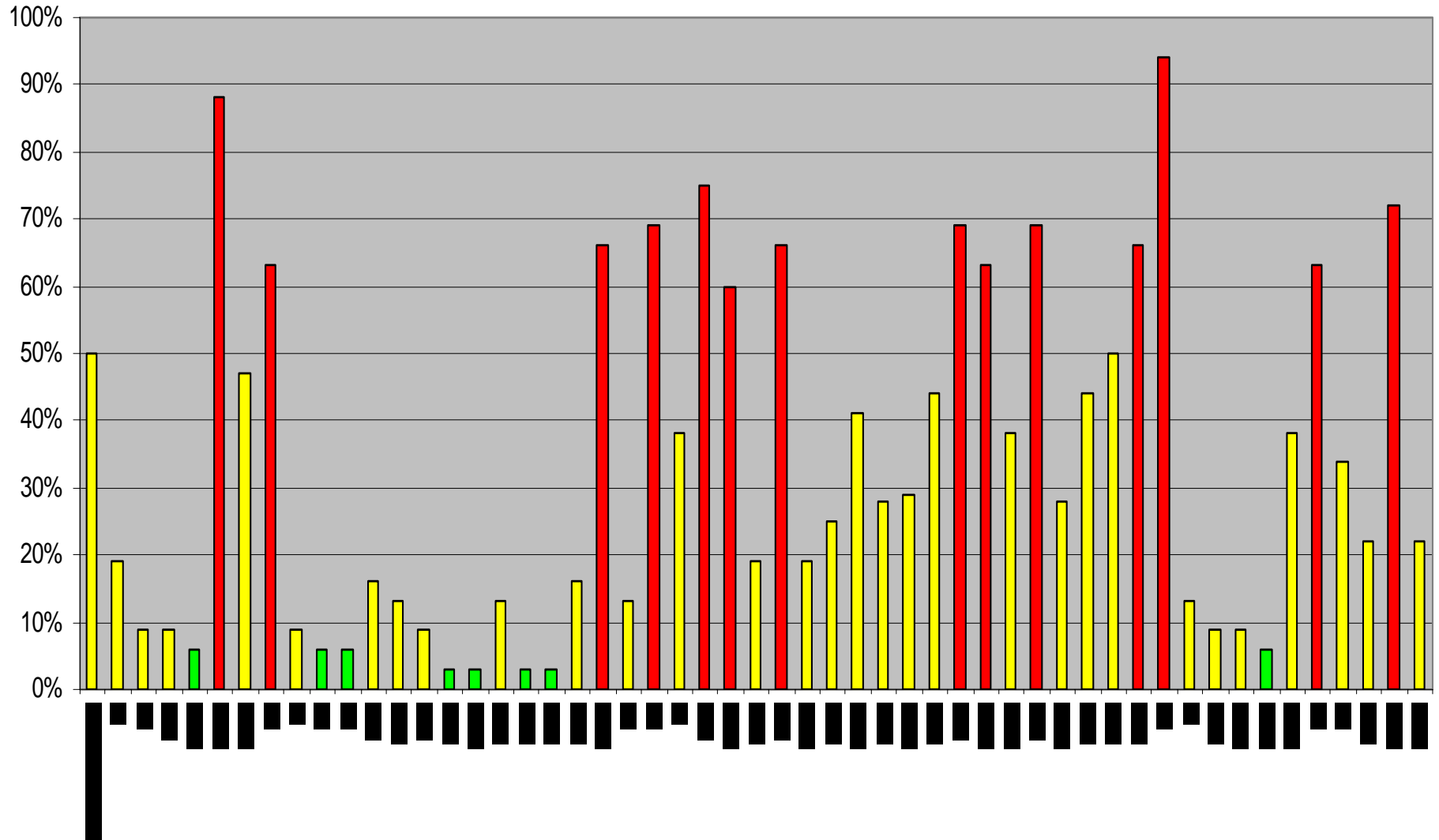
AS9100 Sections Most Identified During Audit
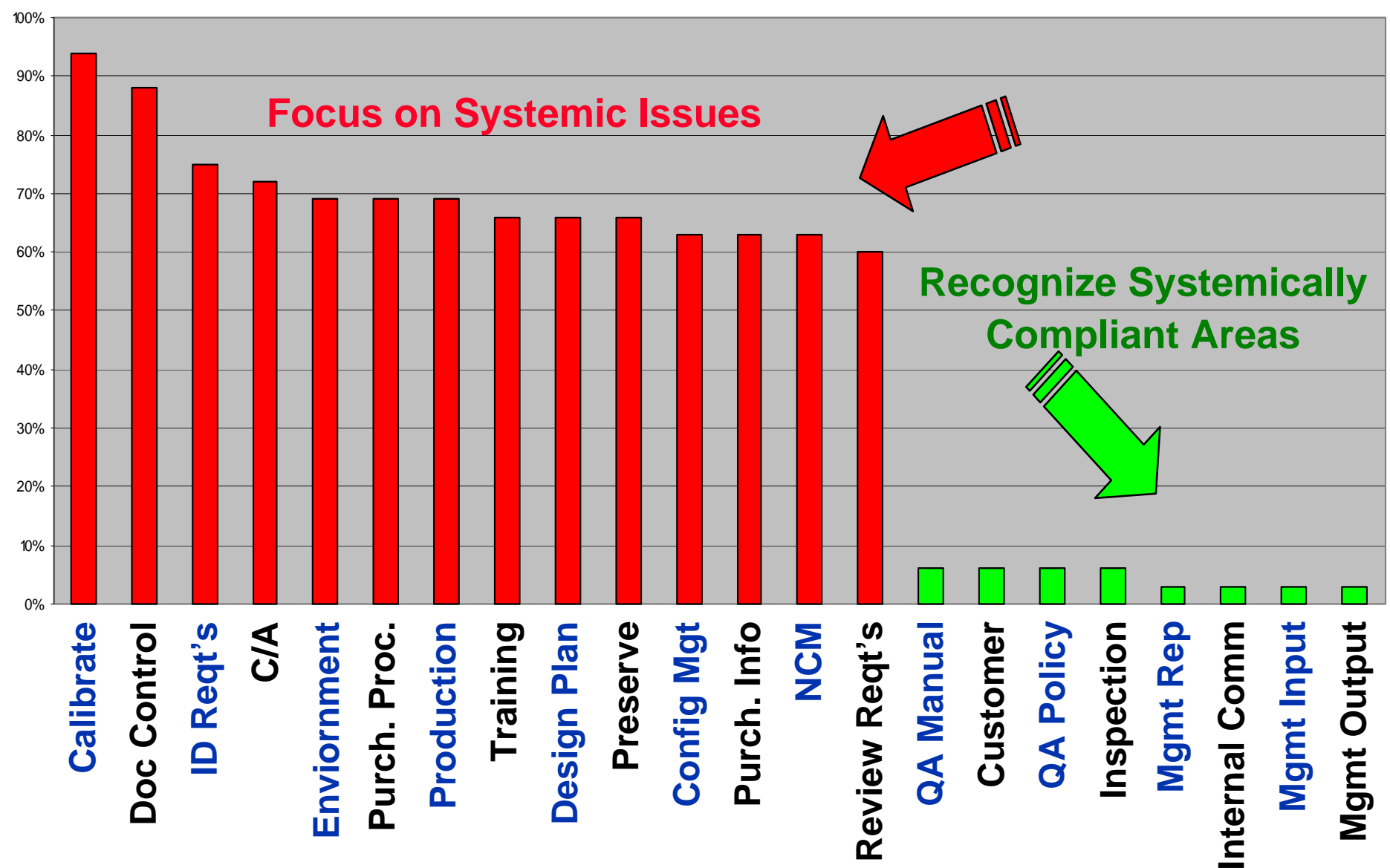
Suppliers with ≥ 1 AS9100 Finding per Section

Assess All, But Focus on Systemic Issues
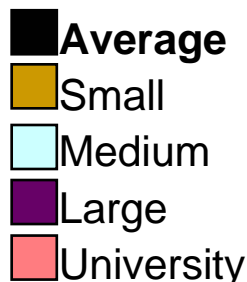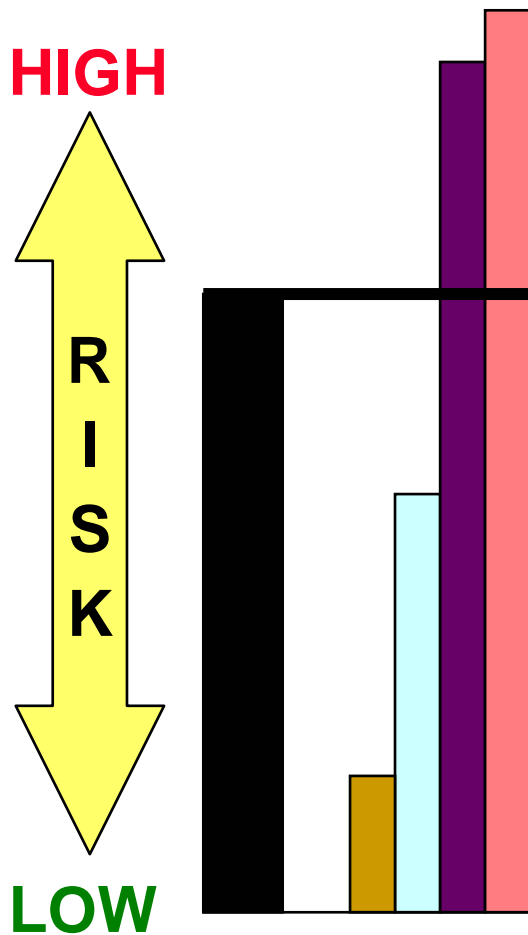
Focus on Systemic Issues

Recognize Systemically Compliant Areas

Categories (left to right): Calibrate, Doc Control, ID Reqt's, C/A, Enviornment, Purch. Proc., Production, Training, Design Plan, Preserve, Config Mgt, Purch. Info, NCM, Review Reqt's, QA Manual, Customer, QA Policy, Inspection, Mgmt Rep, Internal Comm, Mgmt Input, Mgmt Output

The Infrastructure Impacts Everything

NASA Supplier

Launch Vehicle — Human Rated — Ground Station — Payload Instrument

Programs Projects

Calibration — Config. Mgmt — Doc Control — Production — Infrastructure — Req'ts — Purchasing — Enviornment — Corrective Action

Software

HIGH

R I S K

LOW

Average
Small
Medium
Large
University
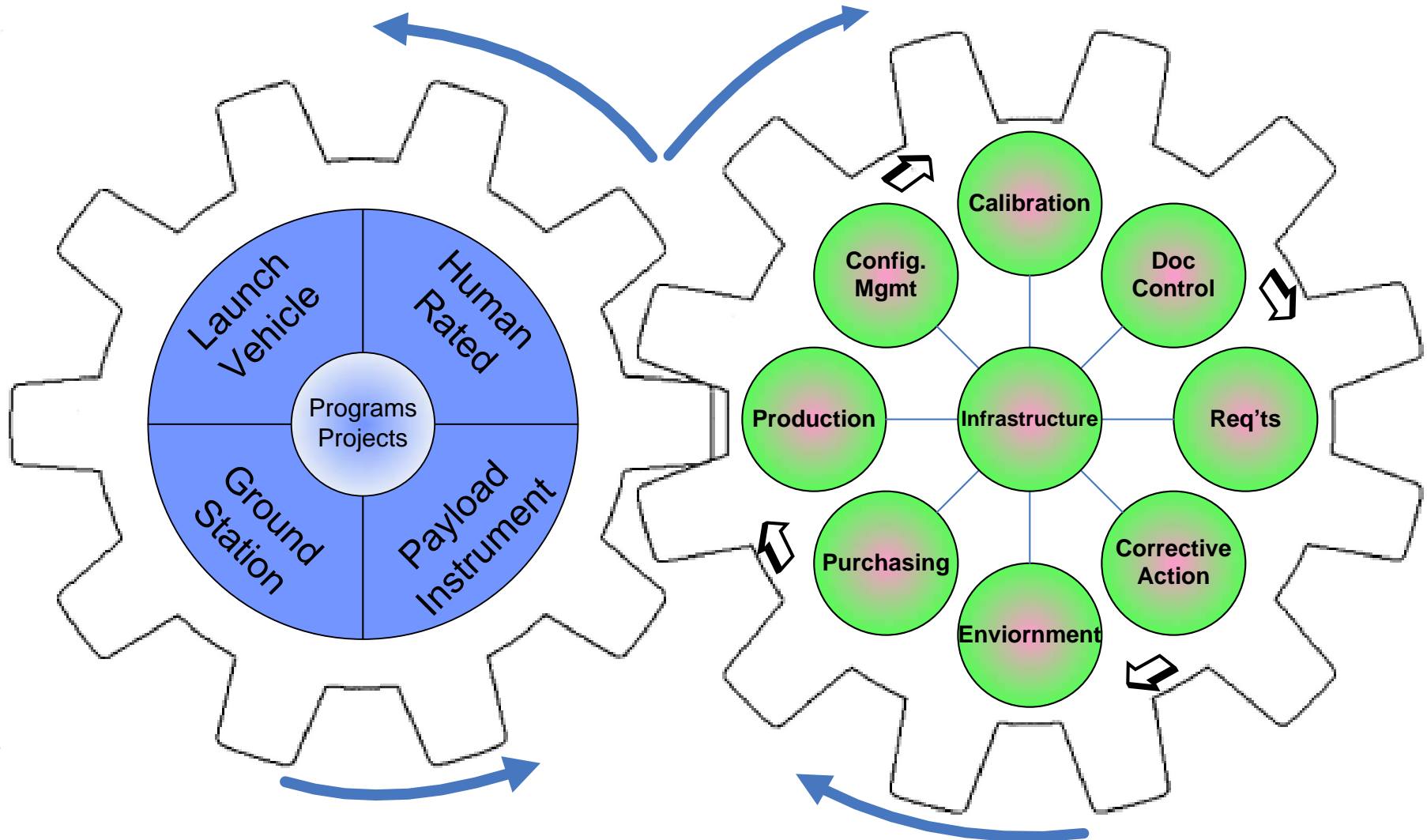
➢ **No Configuration Management Process**

➢ **Amendment to Instrument Coding Standard made without Peer-Review**

➢ **Life-cycle metrics not distributed as required by contract**

➢ **No Software Safety Program**

➢ **Coding Standards in SDP not used.**

➢ **A "Draft" Satellite Simulator Software is being used.**

Ask for a self-evaluation using a CMMI Maturity Matrix

Calibration

HIGH

RISK

LOW

- **Average**
- Small
- Medium
- Large
- University
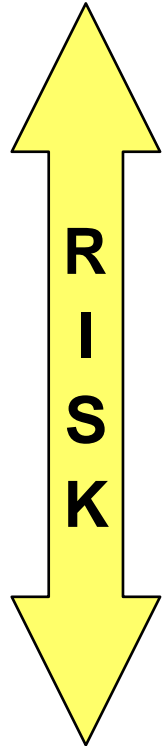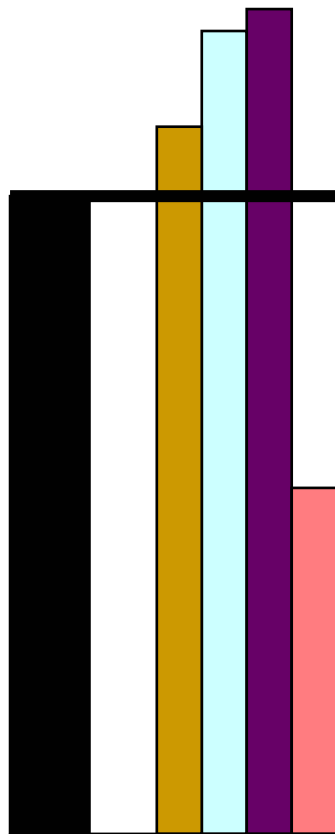
➢ **Height Stand in shop, calibration 10 years old.**

➢ **Thermocouple wire not certified**

➢ **Oven Certified to +71°C – used at +104°C**

➢ **Calibration requirements not on Purchase Orders**

➢ **Power Supply 266 days past due**

Ask supplier to identify
1) **Items past due and**
2) **Calibration Standard used**

Document Control

HIGH

R
I
S
K

LOW

■ Average
■ Small
■ Medium
■ Large
■ University
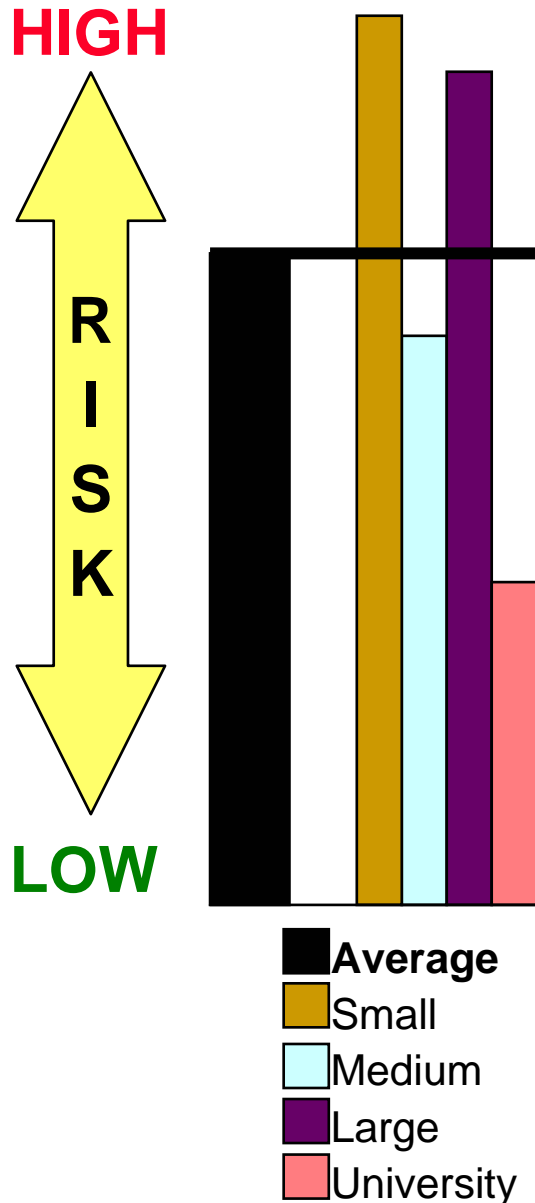
➢ **Mil-Std-1285D, dated SEP 2004, not available – Used Mil-Std-1285B**

➢ **Drawing Rev F in use Rev G released in 1983**

➢ **Obsolete Quality Procedures in use, no process to assure currency**

➢ **Obsolete forms in use**

➢ **Industry Standards not maintained current.**

Closely Review Standards Referenced in their Deliverables

Identify Requirements

HIGH

RISK

LOW

- Average
- Small
- Medium
- Large
- University
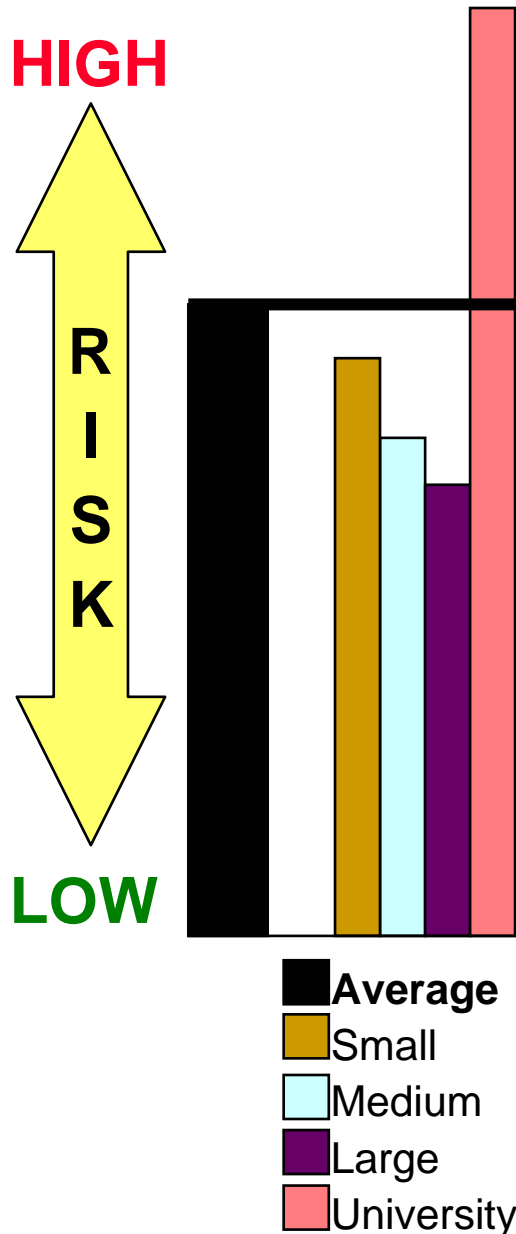
➤ **Items produced & delivered before identifying the Environment & Contamination Requirements**

➤ **Contractually required Stress Relieve Procedure not developed.**

➤ **Unaware of DPAS rating**
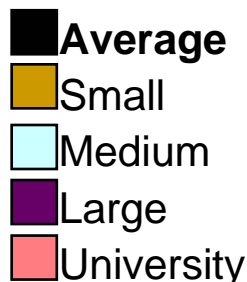
➤ **Wiring 'Crimped'' – Contract requires "Welding"**

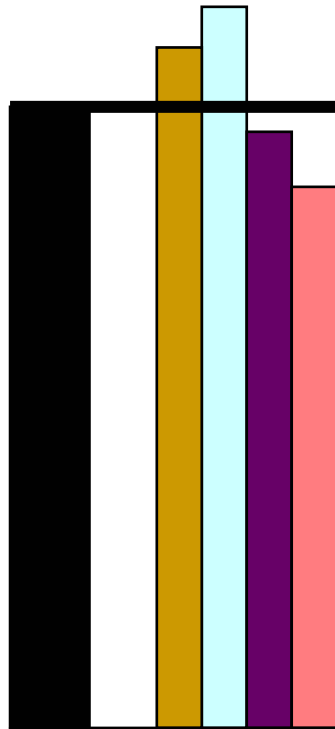**Closely Monitor Deliverables and review Process Documentation.**

Corrective Action

HIGH

**R
I
S
K**

LOW

■ **Average**
■ Small
■ Medium
■ Large
■ University
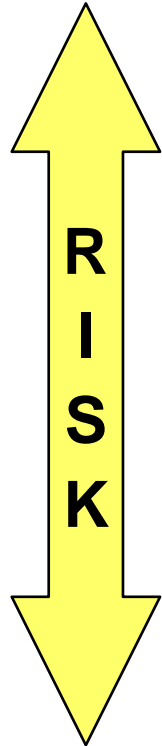
➢ **C/A submitted to NASA was implemented 255 days after commitment**

➢ **C/A was to correctly identify chemicals. C/A closed, but chemicals still not identified.**

➢ **C/A verification audits not conducted**

➢ **Rejected C/A still open a year after it was rejected.**

Review and respond to submitted Corrective Actions and ask for Objective Evidence.

Environment

HIGH

R
I
S
K

LOW

Average
Small
Medium
Large
University
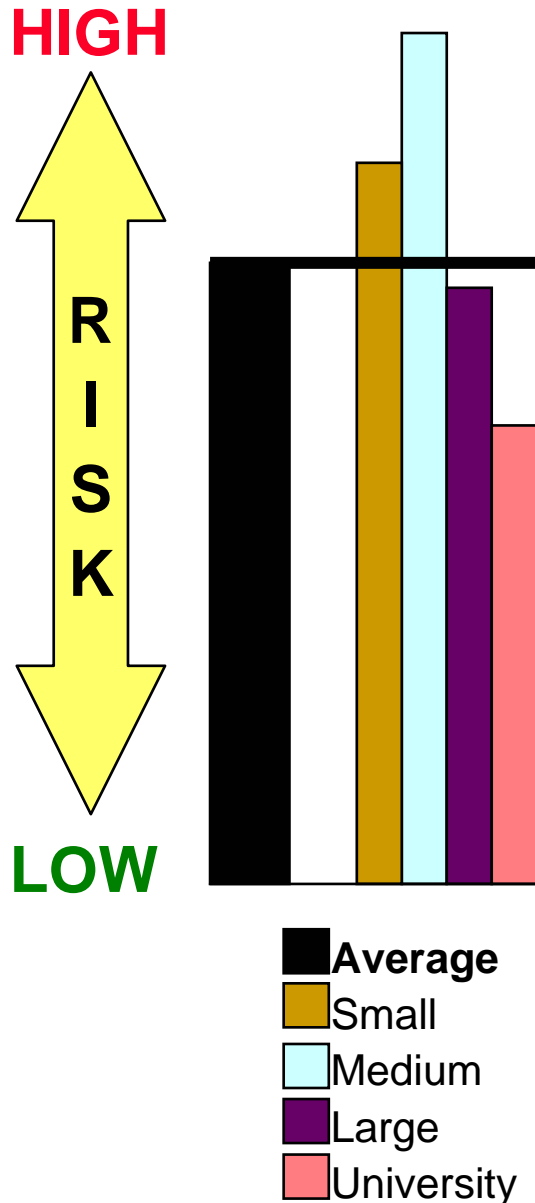
➤ **ESD Bench not Certified**

➤ **Assemblers not wearing wrist straps**

➤ **Relative Humidity warning light disconnected.**

➤ **Clean Room Particle Counts not conducted per schedule**

➤ **Tooling stored outside and rusted**

➤ **Ionizers not used when humidity is below 30%**
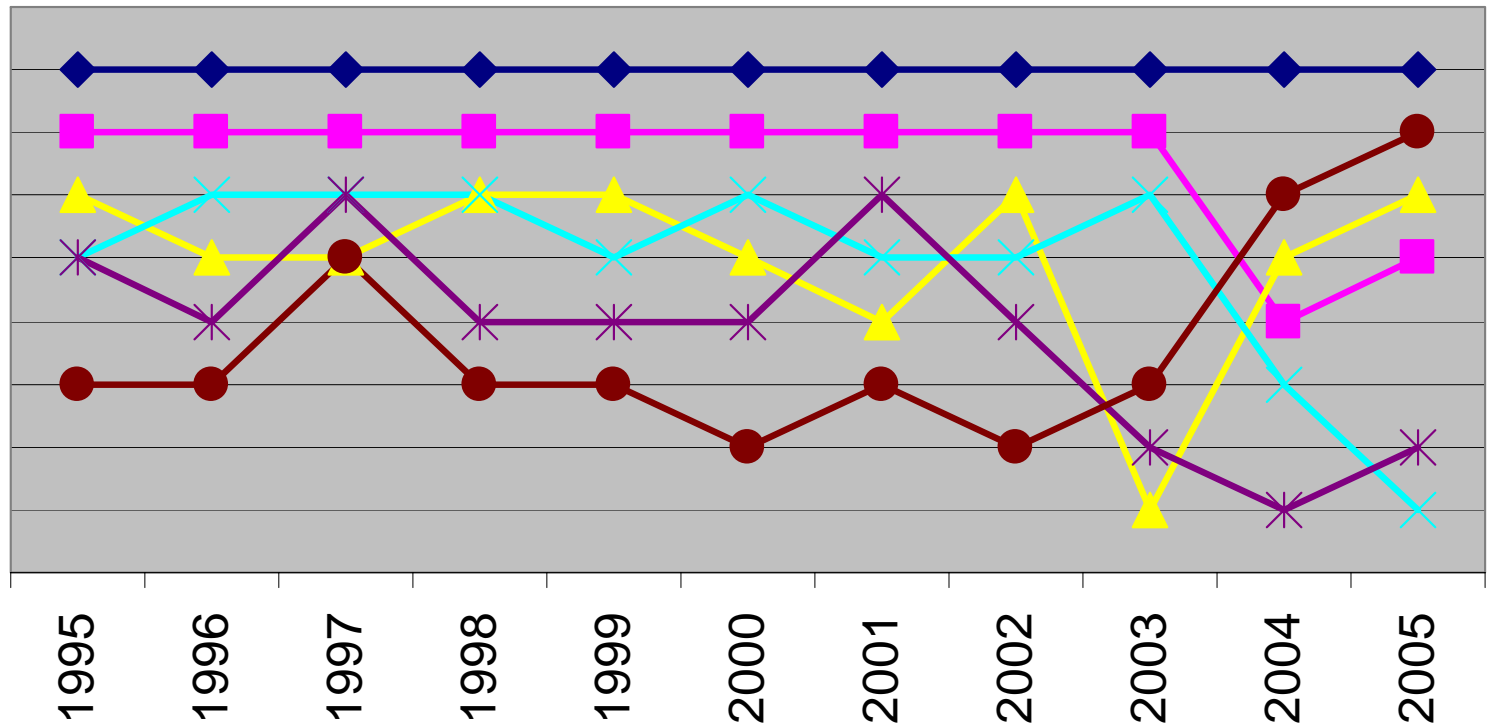
Review ESD and Clean Room Control Procedures

FAA's 11 Year Trend Data

Federal Aviation Administration's (FAA)
Aircraft Certification Systems Evaluation Program (ACSEP)

#1 Problem

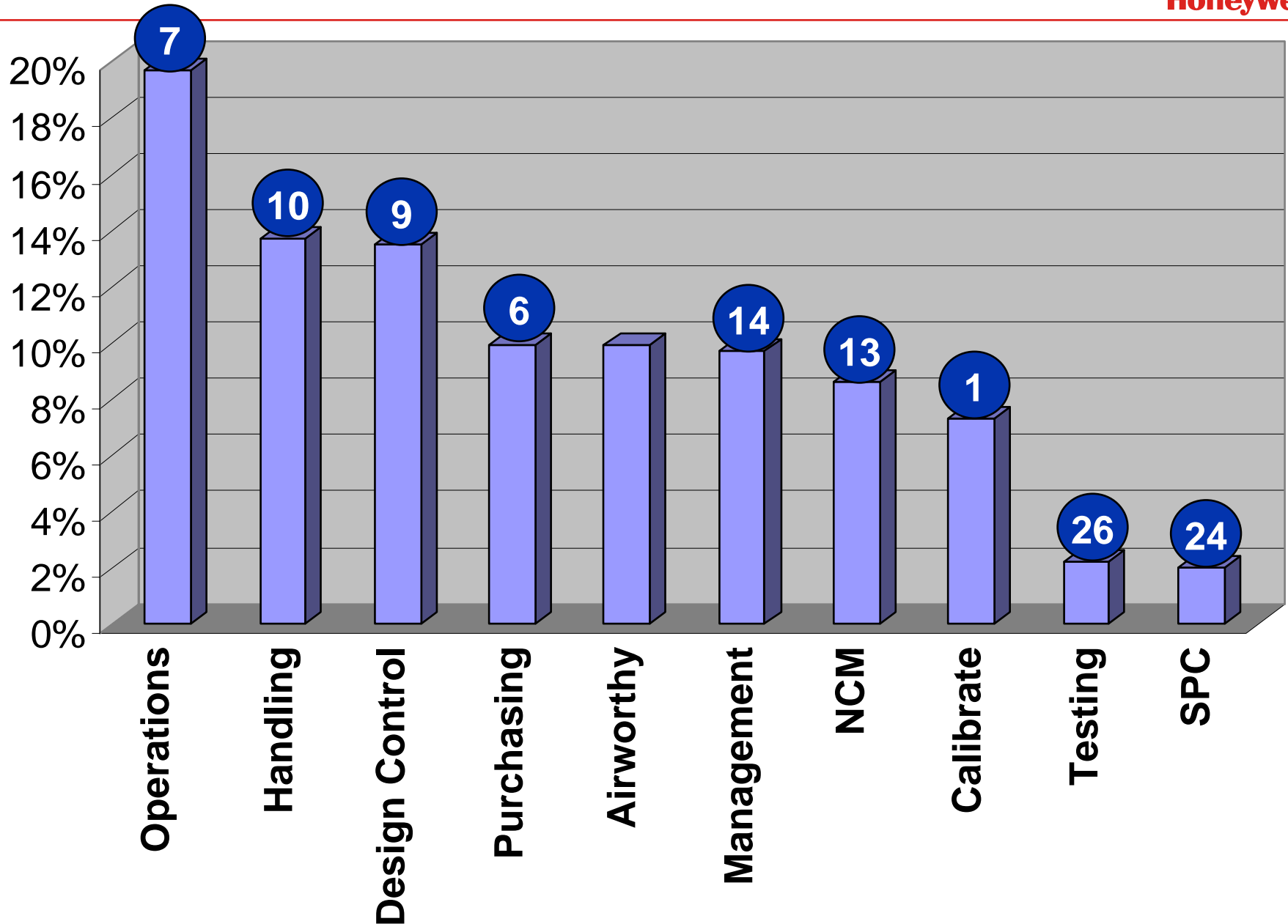| 1 | Manuf Process | 4 | Tool & Gauge |
| 2 | Supplier Control | 6 | Nonconforming Mtl |
| 3 | Design | 5 | Handling & Storage |

Top 10 FAA Concerns Based on 198 Audits in 2005

Bar chart showing percentages with circled numbers:
- Operations: 20% (7)
- Handling: 14% (10)
- Design Control: 14% (9)
- Purchasing: 10% (6)
- Airworthy: 10% (14)
- Management: 10% (14)
- NCM: 9% (13)
- Calibrate: 7.5% (1)
- Testing: 2.5% (26)
- SPC: 2.5% (24)

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Compliance Verification Information System (CVIS)

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NASA Headquarters is developing a program that will be capable of providing real-time metrics derived from IPS, IFO, and PA&R results as well as other audits/assessments funded by the Review and Assessment Division (RAD).

CVIS will provide Data to NASA Headquarters
as well as
become an Information Resource to Centers

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